

TECHNICAL REPORT

Electrical interface specifications for self ballasted lamps and controlgear in phase-cut dimmed lighting systems

Withhold@M

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.99

ISBN 978-2-8322-3711-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions.....	7
3.2 Abbreviated terms.....	9
4 General description	10
5 General requirements	10
5.1 Voltage rating	10
5.2 Frequency rating.....	11
5.3 Marking of controlgear	11
6 Description of the lighting system and its components.....	11
6.1 Wiring method.....	11
6.2 Wiring diagram.....	11
7 Electrical specification	12
7.1 General.....	12
7.2 Electrical characteristics during the on state of a phase-cut dimming system	12
7.2.1 General	12
7.2.2 Electrical characteristics for leading edge dimming method	12
7.2.3 Electrical characteristics for trailing edge dimming method	17
7.3 Electrical characteristics during the off state of a phase-cut dimming system	23
8 Test procedures	24
8.1 General.....	24
8.2 Tests for leading edge dimmable devices.....	24
8.2.1 General	24
8.2.2 Test related to the non-conducting phase	25
8.2.3 Test related to the transition from the non-conducting to the conducting phase and to the conducting phase.....	25
8.3 Tests for trailing edge dimmable devices	25
8.3.1 General	25
8.3.2 Test related to the conducting phase	25
8.3.3 Test related to the transition from the conducting phase to the non-conducting phase	26
8.3.4 Test related to the non-conducting phase	26
8.4 Tests for characteristics during electronic off state.....	27
Annex A (informative) Voltage shapes to be used with the tests in IEC TR 63037	28
A.1 General.....	28
A.2 Waveform description	28
A.3 Waveform description	28
Annex B (informative) Equivalent phase-cut dimmer circuit	29
Bibliography.....	30
Figure 1 – Example of wiring diagram	11
Figure 2 – Timing leading edge dimming method	13

Figure 3 – Timing trailing edge dimming method	18
Figure 4 – Test setup for testing the conducting phase	24
Figure 5 – Test setup for the transition from the conducting to the non-conducting phase	26
Figure 6 – Test setup for the non-conducting phase	27
Figure A.1 – Waveform of AC voltage source	28
Figure A.2 – Waveform of AC voltage source	28
Figure B.1 – Scheme of the EC_D	29
Table 1 – Nominal mains voltage 100 V; frequency 50 Hz or 60 Hz	14
Table 2 – Nominal mains voltage 120 V; frequency 50 Hz or 60 Hz	14
Table 3 – Nominal mains voltage 200 V; frequency 50 Hz or 60 Hz	14
Table 4 – Nominal mains voltage 230 V; frequency 50 Hz or 60 Hz	15
Table 5 – Nominal mains voltage 277 V; frequency 50 Hz or 60 Hz	15
Table 6 – Slew rate for voltage decrease across the phase-cut dimmer	16
Table 7 – Nominal mains voltage 100 V; frequency 50 Hz or 60 Hz	16
Table 8 – Nominal mains voltage 120 V; frequency 50 Hz or 60 Hz	16
Table 9 – Nominal mains voltage 200 V; frequency 50 Hz or 60 Hz	17
Table 10 – Nominal mains voltage 230 V; frequency 50 Hz or 60 Hz	17
Table 11 – Nominal mains voltage 277 V; frequency 50 Hz or 60 Hz	17
Table 12 – Nominal mains voltage from 100 V to 277 V; frequency 50 Hz or 60 Hz	19
Table 13 – Nominal mains voltage 100 V; frequency 50 Hz or 60 Hz	20
Table 14 – Nominal mains voltage 120 V; frequency 50 Hz or 60 Hz	21
Table 15 – Nominal mains voltage 200 V; frequency 50 Hz or 60 Hz	21
Table 16 – Nominal mains voltage 230 V; frequency 50 Hz or 60 Hz	22
Table 17 – Nominal mains voltage 277 V; frequency 50 Hz or 60 Hz	22
Table 18 – Currents and voltages for controlgear during the electronic off state	23
Table 19 – Parameters for testing purposes	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INTERFACE SPECIFICATIONS
FOR SELF BALLASTED LAMPS AND CONTROLGEAR IN PHASE-CUT
DIMMED LIGHTING SYSTEMS**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 63037, which is a Technical Report, has been prepared by IEC technical committee 34: Lamps and related equipment.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
34/305/DTR	34/325/RVC

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

Withdrawn

INTRODUCTION

This document describes the technical requirements for self-ballasted lamps and controlgear to work with phase-cut dimmers. For a complete picture of the technical requirements the user should also refer to the companion document that contains technical requirements and testing methods for phase-cut dimmers (IEC TR 63036).

Withdrawn

ELECTRICAL INTERFACE SPECIFICATIONS FOR SELF BALLASTED LAMPS AND CONTROLGEAR IN PHASE-CUT DIMMED LIGHTING SYSTEMS

1 Scope

This document specifies the electrical interface between phase-cut dimming equipment and lighting equipment, such as LED integrated lamps and light sources with external controlgear, with the intention of helping designers of both types of equipment to develop products that will work together properly.

This document describes both the dimming phase and the off phase. In addition to the specification of the interface, test procedures are given for testing the proper operation.

It may be expected that controlgear fulfilling the requirements of this document are also suited to be used with electronic switches that use a circuitry comparable with that of a phase-cut dimmer, but do not contain means for the adjustability of the phase-cut angle.

Safety requirements are not covered by this document, but by respective product standards

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-845, *International Electrotechnical Vocabulary. Lighting* (available at <http://www.electropedia.org>)

IEC 62504, *General lighting – Light emitting diode (LED) products and related equipment - Terms and definitions*